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ABSTRACT

This literature review outlines the assessment activities for competency based education (CBE) in five different disciplines in higher education, and discusses two approaches to assessment in programs leading to degrees in library science and media. Assessment efforts in CBE programs relating to library science and media are emphasized in order to tie the findings of this review to the research efforts of Daniel and Ely (1978), which are directed toward filling the assessment gap within CBE programs for school media personnel. Two matrices for guiding evaluation strategy and test construction are described which may help overcome problems facing CBE assessment. Innovators are warned that the impact of CBE programs will be diminished if they fail to deal with problems of CBE assessment. (Author/CMV)

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COMPETENCY BASED ASSESSMENT:

An Update

by

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COMPETENCY BASED ASSESSMENT:

An Update

Introduction

Competency-based education constitutes the general framework for this review of assessment methods. Competency-based education is a process consisting of a number of common elements: competency identification, criteria development, competency assessment, and program development (Elam, 1972). Rosner and Kay (1974) suggest that competency identification continually awaits validation through assessment.

Originally, the movement dealt largely with teacher training and was known as competency-based teacher education (see Elam 1972, Houston and Howsam, 1972, Hall and Jones, 1976, Rosner and Kay, 1974). The potential for applying this innovation to other fields soon became obvious, however; and while a CBTE emphasis remains, other professional areas are adopting competency-based education principles and techniques as well. Examples are: the medical arts, social work, psychology, and the library/media profession. The CBE movement originated in higher education, but competency-based programs can also be found in primary, elementary and secondary school levels (as in the Fountain Valley School District in California). The character of competency-based education is disparate and its impact pronounced.

This paper examines the state of the art, not of the general framework, but of one CBE element; namely,

competency assessment. The responsibility of discovering whether students actually achieve a competency falls directly on the assessment element of CBE programs. The need to capture an accurate view of competency attainment makes the importance of assessment obvious. Harris and Kelly (1976) go so far as to assert that the major development of CBE systems should "lie with the design of appropriate performance assessment" (p. 247). Others (Rosner and Kay, 1974, Kay, 1973; Hodgkinson et al., 1975) assert that the eventual success of CBE will relate directly to successful advances in assessment procedures. This paper examines some of these advances in current CBE programs.

Throughout the review the paper will discriminate between assessment and evaluation. We will take evaluation to be the broader term and assessment to refer to the specific evaluation of learning outcomes. Flanders (1974) identified a prime CBE task to be the continuing evaluation (author's emphasis) of performance. Evaluation experts would argue that what Flanders meant was assessment of performance (Kelly, 1978). Evaluation as a term has undergone considerable change since it was used in the early days (see Tyler, 1950). Today, evaluation relates to programs and products more than to individuals; and is specifically oriented to policy-related decision making (Stake, 1968; Stufflebeam, 1969). A more appropriate term for evaluating performance seems to be assessment. In fact most of the current literature employs the term assessment when speaking of student evaluation of

competency-based education (Houston, 1974; Chisholm and Ely, 1976; Reilly et al., 1977).

It would be misleading to suppose that there is any real consensus of meaning with respect to the term. Hodgkinson and his colleagues (1975) define assessment as the diagnostic-like procedures of pre-testing and post-testing (p. 3). In another place they define the term broadly as evaluation (p. 75). Derek Rowntree (1977) considers assessment as a field and warns the reader that as such it is "full of conceptual quagmires and terminological traps for the unwary or shortsighted" (p. 9). The fact is that while discussions on assessment may proceed as if every one had a common perception of the term

we must keep asking ourselves... whether an author is talking about evaluation or assessment, informal assessment or formal, formative or summative, pedagogic or classificatory (p. 9).

CBE Programs

In this work, assessment will be taken to mean the procedures used by existing programs to determine student competence. In some cases, assessment will be called evaluation. Hodgkinson et al. (1975) refers to student assessment indiscriminately as evaluation and assessment. In other cases assessment will be a single test (Markle and Capie, 1974). This section reveals the assessment efforts of CBE programs in several disciplines. In each case the purpose of the program will be indicated, the manner of assessment will be outlined, and, some strengths and weaknesses of the assessment element will be mentioned.

Particular emphasis will be placed on assessment efforts in areas relating to library science and media. This is done in order to tie the findings of this review to the research efforts of Daniel and Ely (1978) which are directed toward filling the assessment gap within competency-based programs for school media personnel.

Oregon State: One effort in developing a system of assessing teacher competency was undertaken by the faculty of Oregon College of Education and the Oregon State System of Higher Education (Schalock, 1973). These two groups developed the assessment system around seven teaching functions. The functions related to defining objectives, defining next learning steps and the like.

Two contexts were selected for examining these competencies:

1. Lesson teaching.
2. Short-term full responsibility teaching.

The measures of competency were based upon delimited professional judgments.

At least two separate professional judgments were obtained in relation to each competency demonstration; one from /the/ school supervisor and one from /the/ the school principal. An evaluative judgment was also obtained from a content specialist if a student requested it (Andrews, 1973, 65-66).

A rating protocol was employed which required (1) individual competency judgments and (2) overall judgments.

When taken at face value the data suggested that the system was essentially non-functional. However, project reviewers (Shalock and others, 1973), felt that to view the results in this way would be an over interpretation. Several reasons served to explain the results. The newness of the program and its accompanying demands on the supervisory staff at the college caused items to be omitted and

ratings to be missed to the degree that the results have to be examined with extreme caution. These results, notwithstanding, the assessment system on the whole

was judged to be sufficiently successful in its first year of operation that OCE faculty, co-operating school supervisors and administrators and students recommended that it be instated as the "regular" program in the elementary division of the college (p. 60).

This recommendation notwithstanding, several difficulties attended on the project. One particular^y important difficulty related to the development of measures of competency that were trustworthy. In the absence of a significant degree of trust the competency measures could do little to advance the CBE effort at OCE.

In the review of the OCE program Schalock and others (1973) identify several major aspects of the assessment system.

1. A basic outline of the system.
2. Definitions of basic constructs, dimensions, and methodologies of the system.
3. Data management and utilization strategies.
4. An evaluation of the systems' utility.

Lists such as this may prove helpful to others attempting to develop assessment systems into their competency-based programs. Several of these elements are evident in the Teacher Assessment Project currently in effect in Georgia.

Georgia Program: The Teacher Assessment Project (Okey et al, 1978) has been designed to assess teaching competencies in the State of Georgia. The assessment procedures in the program include five instruments which yield evidence concerning 18 teacher competencies under the following categories.

1. Planning instruction.
2. Instructing.
3. Managing instruction.
4. Providing the learning environment.
5. Evaluating.
6. Being a professional.

All instruments employ a rating protocol. A data collector, an administrator, and a master teacher complete three of the instruments:

1. "Teaching Plans and Materials".
2. "Classroom Procedures".
3. "Interpersonal Skills".

The "Professional Standards" instrument is completed by a fellow teacher nominated by the teacher being assessed, and by an administrator possessing detailed knowledge of this teacher's professional activities and others (see p. 35 of "Teacher Performance Assessment Instruments: Manual for Data Collectors," 1978). Students complete the "Student Perception" instrument.

Reliability and validity studies were conducted on these instruments (Ellett and Johnson, 1970). The findings show evidence (1) of construct validity and (2) that the evaluation approach is reliable. The Georgia program provides a good example of the type of validation research which needs to accompany general CBE assessment efforts.

University of Southern Illinois Medical Program:

The undergraduate medical curriculum of the Southern Illinois University School of Medicine has been competency-based since its inception in 1973. In the SIU program competencies are presented in the form of behavioral objectives. These objectives (competencies) are put into modules which

1. Provide a rationale for the competency.
2. Suggest learning experiences.
3. Suggest procedures for assessing student achievement.

The program extends over a 36 month period, and is divided into four sequences. The sequences are blocked according to "organ systems" and "clerkships". Clerkships are clinical experiences. Modules address "problem units". Problem units are medical cases with related questions and instructional modules designed to develop the competencies.

After the original competency-based program had been in operation for two years, it was noted that students who initially demonstrated a specific competency were later found to be deficient with respect to that competency. This factor caused curriculum developers at the school to design a competency maintenance system which does the following.

1. Provide students with important competencies learned earlier.
2. Require students to put together important competencies which they have not previously integrated.
3. Require application of the integrated information to a solution of some previously encountered problem.

Students failing to demonstrate competency maintenance are recycled into the course modules.

Evidence of competency is obtained through a variety of means. Instructional teams determine the need for the mode of assessment for each problem unit. Some assessments are in written form, while others are small group, oral assessments conducted by individual team members. At the time of the report (Williams, 1976), assessment procedures had been developed only for one block in one sequence. The examination for this block was formatted in a case approach. Information which did not require retention, was presented as data given in the introduction of the case. Examination procedures await validity and reliability studies.

Of particular interest is the summary of assessment procedures prepared by Dawson and others (In Williams, 1976, p. 195-196). Listed in this summary are eight assessment procedures with a host of comments on issues such as advantages/disadvantages, validity/reliability, time and scoring. The summary provides a powerful way of examining the factors affecting the design of assessment systems, and exemplifies the matrix approach to assessment which is emphasized below.

Minnesota Pharmacology Program: The competency-based pharmacology program at the University of Minnesota employs an assessment center approach to competency measurement. Students are directed to the assessment center where they are tested on the instruction which has previously occurred. The measurement, according to Holloway (1978), is theoretician's measurement. That is, it is measurement which is concerned with the nature of the tools and seeks traditional forms of reliability and validity.

Of particular interest is the "programmed testing" format (Miller and McGuire, 1961). Tests following this format direct the student from one question to another based on response selection. That is, the test is programmed to be sensitive to each possible response and what the response means in terms of the "final" solution.

The test yields a performance score and an efficiency score. The performance score points up "right/wrong" response ratios. The efficiency score points up the student's ability to choose those answers which move him through the test.

University of Washington, Seattle: For school social workers the University of Washington, Seattle features a consortium-directed competency-based program. Consortium-directed means that a number of groups work together to promote and assess the competency of school social workers. Performance criterion coincides with the bachelor of social work level of training. The consortium consists of (1) a policy board, (2) a candidate review board, and (3) a core of advocates who guide and support the candidates. The burden of proof lies largely with the candidate who works with the advocate in gathering evidence indicative of competence. All types of evidence are acceptable for review, and specific tasks can be evidenced on the job or through simulations or mock-ups. Use of media is encouraged.

Competency certification is awarded by the Candidate Review Board (CRB). The candidate and his/her advocate appear before the board at the time of certification review. Following a successful presentation of evidence, like portfolio and advocate opinion, the candidate is recommended for certification by the CRB.

The openness of this model suggests that coordination of personnel might be a problem. In fact, organizing teachers and administrators to take part in the process has proven difficult (Ellis and Bryant, 1977). Ellis and ^{Bryant} Johnson (1977) group additional problems into 5 categories.

1. Initial organization.
2. Competency-based criteria.
3. Communication and parameters.
4. Time and funds.
5. Geography.

Even these problems, however, do not diminish the utility of peer review and advocacy in the process of competency assessment in the University of Washington program.

Chisholm and Ely: Chisholm and Ely (1976) co-author a competency-based textbook which is designed to train library/media professionals. Nine functions performed by the library/media professional are identified. Performance of these functions is dependent upon a number of competencies. These competencies are identified and described. Resources and activities necessary for acquiring the competencies are listed. A mastery item to assess the competency is then provided. Finally the student is required to respond to the mastery item in a test of competency.

Assessment is confined to paper and pencil tests. The tests are reviewed by experts, (i.e. the instructor). The authors acknowledge that other tests of performance are available, which may be better; but, because of the constraints attending the "better" methods, they are replaced with procedures which effect the same thing. In this case, the paper and pencil test.

The Chisholm and Ely effort is notable for its innovative application of the competency-based methodology in a field only recently embracing competency-based education principles and techniques.

The AASL Model: In 1976 the American Association for School Libraries published Certification Model for Professional School Media Personnel. The booklet proposed a competency-based model for the training and certification of library/media personnel. The committee adopted the unified concept of library and media generated by our rapidly changing society. The need to keep up with the technological developments provides a full range of materials accompanying technology, and services to meet the inspirational, informational and recreational needs of the user and persons working in this type of environment need competencies derived from programs in

1. General education.
2. Professional education.
3. Media specialization.

Seven areas of competence are identified by the AASL Committee. Two examples are:

1. Relations of media to instructional systems, and
2. Production of media.

A number of competencies can be identified under each area. Data reflecting these competencies are obtained through strategies or techniques.

1. Rating performance under observable conditions.
2. Self-assessment.
3. Portfolio review.

4. Paper and pencil tests.
5. Personal attribute assessments.
6. Simulation exercises.
7. Recommendations.
8. Transcript analysis.

The committee expressed the feeling that the competency-based programs require the input of a number of groups: the educational community in general; media professionals; teaching personnel, and administration.

The program is supportive of a competency-based approach and provides a general outline for competency-based programs in this area. Although the assessment problem goes undiscussed, the importance of the document is clear because it provides a point of departure for innovative library/media programs.

The above programs reflect current assessment efforts in competency-based education. Froehle, 1976; Lareau, 1976; Kocker, 1975; Williams and others, 1977 exemplify similar approaches. Regardless of these efforts the problem of CBE assessment has not abated significantly over the years (Reilly et al. 1977). Major problems with respect to the measurement of performance and its subsequent validation continue to exist. In only a few cases are measures enhanced through validation studies (e.g. Ellett and Johnson, 1978). Harris and Kelly (1976) insist that problems such as these threaten the credibility of a competency-based curriculum, and in some cases contribute to the decline of competency-based efforts (Velleme, 1977). Harris and Kelly further state that efforts to adopt CBE methods

cannot succeed unless the profession emphasizes the development of performance assessment strategies and techniques much more (p. 241).

Furthermore,

the credibility of any competency-based curriculum rests directly on the adequacy and appropriateness of its assessment procedures (p. 247).

In part, the problems in assessment are due to the limitations of the measurement art (Kay, 1973). McDonald (1973) states that the problems may be due more to the lack of experience with the technology of performance assessment, than with lack of knowledge of what to do.

If, as Harris and Kelly indicate, competency-based education cannot be advanced as a credible innovation without credible assessment strategies and appropriate techniques, then steps must be taken to provide these. Hodgkinson and his colleagues (1975) state that what is necessary if CBE is to succeed is a number of "instruments capable of much finer gradations, instruments capable of providing formative diagnostic advice, and instruments capable of telling us if the student is "real world" competence..." (p. 3). The instrumentation is of limited value, however, if it is applied in the absence of a strategy which by virtue of its logic and coherence, offers credible indicators of performance capabilities.

The approach which Hodgkinson and his colleagues developed to effect this quality is found in the Evaluation Strategy Matrix (Fig. 1).

EVALUATION STRATEGY MATRIX

PROBLEM: _____

UOM	ROLE PLAYING	SIMULATION/GAMING	CASE STUDIES	INTERVIEWS
QUESTIONNAIRES	PRE-POSTS	SELF REPORT PARTICIPANT OBSERVATION	STANDARDIZED INSTRUMENT	

The matrix is a device which facilitates triangulation (a concept which states that "different measures, coming from different sources but all indicating the same result, greatly increase the reliability of judgments based on the measure" (p. 74).

The matrix combines up to nine forms of measurement and can include the entire spectrum of evaluation--from individual tutorials to institutional evaluation. "It is not a data-gathering instrument per se, but a method of employing data-gathering instruments" (p. 76). The matrix promotes strategy building in assessment.

A similar matrix offered by Rogers (1978) relates to testing strategies in the fields of library science and media. Her Matrix for Test Construction (Fig. 2)

Matrix for Test Construction

Competence Category

Identification
Location
Production
Evaluation
Integration
Utilization

Cognitive Domain Category

Knowledge
Comprehension
Application
Analysis
Synthesis
Evaluation

Format Category

All formats
Print
Auditory
Visual
Audio-visual
Multi-format

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organized⁵ assessment along three dimensions: format category, cognitive domain category and competency category. The matrix serves as an aid to developing better measurement instruments. However, it overlooks the dimension of instrument format which the Hodgkinson matrix emphasizes. Nevertheless, the Matrix of Text Construction is not to be disregarded, since it exhibits utility with respect to assessment strategies.

The matrices are important attempts at developing the technology of assessment within competency-based programs. Discussions on assessment strategy and assessment technique will also serve to advance the technology of performance assessment. The literature employs both terms, but the differences between them is not always clear despite an emerging crystalization of the concepts (Williams et al, 1977; Hodgkinson et al, 1975; Harris and Kelly, 1976; Reilly et al, 1977).

The road out of the assessment dilemma is dependent largely upon the development of a systematic and coherent technology of assessment. In some places these are referred to as strategies (Hodgkinson et al, 1975). In other places they are called systems (Schalock et al, 1973). Notions such as triangulation will lead to credible and convincing evidence with respect to competencies. Distinctions between theoretician's measurement and clinical measurement (Holloway, 1978) are likely to prove useful. Holloway (1978)

suggests that competency-based programs monitor the measurement literature as a way of staying informed about assessment technology. Finally, validation efforts must accompany assessment systems and procedures (Reilly, et al, 1977).

It is unlikely that even these efforts will allay all the problems attending measurement in competency-based programs. Yet, in their absence competency-based education could well recede in its impact, simply because it cannot provide substantial evidence that what it says about competency can be believed.

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